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ABSTRACT

The major approaches to language teaching (audiolingual method, generative grammar, Community Language Learning and Silent Way) are investigated to discover whether or not they are compatible in structure with an information-processing model of memory (IPM). The model of memory used was described by Roberta Klatzky in "Human Memory: Structures and Processes" (1976). This is a three-stage process. First, a stimulus is registered in a sensory register. There, a pattern is recognized and somehow equated with a meaningful concept. Then, inputs are passed on to the short-term memory stage (STM). Here, the information is stored briefly and worked on prior to its passage into the third stage, long-term memory, for storage. The situation of a speaker of English who hears the question "How are you?" in Dutch is used to illustrate the model. The process as it is described can provide some explanations of common problems which occur in the foreign language class, such as failure to recognize an oft-drilled structure or repeated mistakes in the structure. A beginning lesson from each of the four approaches mentioned is analyzed and criticized according to the memory model. IPM would predict that the Silent Way method should be successful. (AMH)

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FOREIGN LANGUAGE METHODS AND
AN INFORMATION PROCESSING MODEL OF MEMORY

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INTRODUCTION

If a native speaker of English who knows no Dutch is asked the question "Hoe gaat het met U?", he is likely to reply "I don't understand." If asked the same question in English "How are you?", he will, however, answer appropriately. He understands the concept expressed, but not the phonemic code and syntactical rules which govern Dutch. To learn a new phonemic code and a new set of syntactical rules is the task of the foreign or second language (F-L) learner. It is the position of some cognitive psychologists that "Learning can be viewed as adding to or modifying the human memory system." (Klatzky 1975, p. 1.) Therefore one could consider learning a second language as simply committing to memory a new phonemic and syntactic code.¹ This thesis is compatible with the typical F-L student's view of what the F-L learning task entails. When asked his opinion on why he is succeeding in or failing a F-L course, he will usually ascribe his success or lack of it to his good or poor memory. Thus the student and the psychologist could be said to agree that memory is the vehicle for developing F-L skills.

¹There are of course other aspects involved in foreign language learning including cultural concepts and semantic differences. But for purposes of this paper the task assumed to be only learning a phonemic and syntactical code.

But, do the F-L methods experts also agree? Most approaches to teaching languages today are based on established psychological and linguistic principles related to learning. The creators and proponents of the four major methods of F-L teaching in use today invoke the work of scientists in other fields to provide theoretical support for their "way" of teaching.

In "Language Teaching: A Scientific Approach", (1964) Robert Lado, the pre-eminent spokesman for the audio-lingual method (ALM) devotes several chapters to the learning theory on which ALM is based. Works by Thorndike, Kohler and Koffka, and Piaget and Sapir, among others are cited. Philip Smith in "Toward A Practical Thoery of Second Language Instruction" (1971) bases his generative grammar (GG) approach to F-L on the work of psycholinguists, John Carroll and Leon Jacobovits, and on Chomskian theoretical linguistics. The methodological approach of Community Language-Learning (CL-L) is based on theoretical learning constructs developed by Carl Rodgers and his student Charles Curran, a leader in the counseling-learning movement. (Begin 1971) Finally, the Silent Way, an increasingly popular method of teaching F-L, is based on the personal work of its developer, Caleb Gattegno. Of all the methods experts, he alone claims no "scientifically" determined theoretical basis for his approach. He says, with reference to the

1963 edition of "Teaching Foreign Languages in the Schools the Silent Way":

There were no references to existing literature in the original book, because it was basically a summary of the findings of one person whose many years of investigation were devoted to the study of language learning and teaching. The content of the text was a set of propositions which expressed what the author alone saw in the field. (Gattegno, 1972, p. vii)

Each of the above authors proposes certain practical applications, classroom techniques, derived from theoretical principles and further assumes that these techniques facilitate F-L learning. The question which arises is: Are these techniques - which by implication are models of learning - compatible with the view that learning a language is adding to or modifying human memory?

Several authors writing on F-L methods have mentioned memory theory when discussing language teaching techniques. Earl Stevick in his recent book "Memory, Meaning and Method" (1976) reviews certain research findings related to memory. Rivers (1964) and Lado (1964) also cite experimental studies which pertain to F-L instruction. But, writers who have dealt with the subject have discussed findings related to single aspects within the total memory process, e.g., recall, short term memory, recognition and chunking. No point by point comparison

between memory as an information processing model of learning and foreign language methodology as a learning model has been done.

This paper, then, proposes to investigate whether the major approaches to language teaching (Audio-Lingual Method, Generative Grammar, Community Language-Learning, Silent Way) are compatible in structure with an information processing model of memory. Roberta Klatzky's theoretical model of memory, as described in "Human Memory: Structures and Processes" (1976) will be outlined and then the model will be applied to the learning of an oral F-L structure. Next, a demonstration lesson as described in each of the previously mentioned methods books will be compared with the model for structural compatibility.

AN INFORMATION PROCESSING
MODEL OF HUMAN MEMORY (IPM)

The information processing model of human memory as described in Klatzky (1976) proposes a system in which the learner through active cognition encodes and stores information about a stimulus for later retrieval. The process of encoding and storage is divided into three stages. During the initial stage a certain amount of information about a stimulus which is outside the system is registered for a short time (seconds at most)

in a sensory register. While the information is in the sensory register, a process that results in contact between information in the sensory register and previously acquired knowledge takes place. That is, a pattern is recognized when the sensory aspects of the stimulus are in some way equated with a meaningful concept. Once recognized and attended to, inputs to the system are passed on to the next stage, short term memory (STM). In the second stage, information is stored briefly (estimates of storage time vary from one second to fifteen minutes) in much the same way as it was held in the sensory register - except no longer in raw, sensory form. Here the information is worked on, i.e. rehearsed, mediated or chunked, prior to being passed even deeper into the system - to more or less permanent storage in long term memory (LTM).

IPM APPLIED TO A F-L STRUCTURE

To illustrate how the system might process a F-L stimulus, let us return to the starting point of this paper. How does this model predict that the Dutch stimulus, "Hoe gaat het met U," might arrive in LTM of an English speaking student? Initially, on presentation, the student hears something equivalent to /*hewkat æ met u w*/ - but not quite; since the transcription is an English approximation of the Dutch phonemic code. While in the

sensory register, a search for a recognizable pattern or a meaningful concept goes on; finding none (since it is assumed the student knows no Dutch) the model requires that the stimulus will not be passed on to STM for eventual storage in LTM. Thus the process is short circuited. But, if it is assumed that a native language meaning equivalent is provided, the stimulus can be passed on to STM.

Once in STM, the stimulus can be processed for LTM storage provided it meets certain criteria. STM has a limited capacity, both in terms of time and number of items which can be processed. Experiments demonstrate that STM capacity for numbers of items held at any one time is seven plus or minus two. The native speaker of Dutch hearing /*hau ɣaɪ ɔC m. ʒɛ lɔ*/ hears eleven phonemes, a number of items beyond the capacity of STM. However because of his knowledge of the Dutch phonemic code and syntactical rules, he is able to recognize patterns. He can process the stimulus by combining phonemes into words, thus reducing the eleven items to five, or even to one item, if the stimulus is considered as a "ritualized greeting formula." He has "chunked" the items - thereby reducing them to a number within the STM storage capacity. Unfortunately the English speaker is in difficulty. He hears eleven phonemes, but does not have the LTM knowledge to chunk the items. Thus some part of the stimulus will

be lost (forgotten) immediately. However, that portion of the stimulus which remains must still be "worked on", if it is to be established in LTM. Two procedures are postulated by the model as part of the "working on" process. They are mediation and rehearsal. In rehearsal, the learner is assumed to repeat either overtly or subvocally the items being learned. During the mediation process the student is assumed to associate new information with categories previously established in LTM. Both processes are believed to increase the strength of the stimulus in LTM. There are again, difficulties for the F-L student in this stage. If another stimulus is presented prior to sufficient rehearsal of the first stimulus, the new stimulus will interfere with the repetition process and the original stimulus will be forgotten. In addition, experiments seem to demonstrate that rehearsal without the mediation process is not sufficient to establish a stimulus in LTM. The mediation process requires categories in LTM which the F-L learner does not have. How, then, does the F-L stimulus get learned? It is the best guess of memory theorists that some form of mental elaboration, possibly mnemonic, is practiced by the learner to move the stimulus into LTM. Retrieval from LTM is an extremely complicated process in which many factors, such as, coding specificity, affective variables and organization of material are involved. Because of the complexity of the

IPM model for LTM, the question of retrieval from LTM will not be dealt with in this paper.

However, the process described thus far can provide some useful explanations of several of the more common problems which occur in the F-L class. For instance, why after as many as one hundred repetitions does a student fail to recognize or recall a particular structure? The IPM model suggests that the item never reached LTM. It could not be recognized as a pattern while in the sensory register and thus never even reached the STM stage. Or, why, after many repetitions does the student continue to eliminate parts of a structure, e.g., ESL students after several years of instruction frequently leave out forms of the verb "to be" in verb phrases. IPM suggests that the original structure may have contained too many items for STM capacity. And, in order to process the structure some of the items were dropped. Then, when the structure was rehearsed, mediated and passed to LTM, only a partial stimulus was stored. Or, again, why after years of practice do students speak with foreign accents. Methods experts ascribe this accent to native language interference. An IPM explanation would be similar but more specific. It would suggest that in the sensory register stage, the new stimulus had been recognized - but as some novel form of the learner's own phonemic code. This stimulus could then be processed and finally stored, almost permanently in LTM in a distorted form.

FOUR F-L METHODS REVIEWED
VIA THE IPM MODEL

A beginning lesson for ALM, the oldest and most prevalent method, is frequently a four line dialogue to be memorized by mimicry and repetition. For example, the following Spanish dialogue taken from "Language Teaching: A Scientific Approach" is suggested as an appropriate first lesson:

"¿Esta Victor?

Si, esta.

¿ Pueda hablar con el ?

Puedes! Victor! Aqui esta Juan."

(Lado, 1964, p. 63)

The dialogue is to be presented orally by the teacher, then repeated by the students.

Lado recommends that:

It is more effective to practice the form until it is familiar and then to attach a meaning to it.

(1964, 65)

He further suggests that if students have trouble imitating the complete dialogue it be broken into, "phrases, words, syllables and individual sounds . . . so that the attention of the student which would normally be on meaning will be on the sounds."

It is apparent that if the IPM model is correct there will be difficulty in committing this lesson to memory. First, the model postulates a pattern recognition search (meaningful concept) while the stimulus is in the sensory register. Yet, Lado suggests avoiding meaning while memorizing. Either of two things can happen at this stage: (1) the whole process will be short circuited for want of a meaningful concept to attach to the stimulus, or (2) students will supply their own idiosyncratic meanings, e.g. "Si, esta." may become "siesta", and be stored as some reference to sleep or a nap. Second, assuming that the stimulus is recognized correctly or incorrectly, and is processed and moved to STM, there will still be the problem of STM capacity. The recommended lesson is comprised of about fifty phonemes, a number far in excess of STM capacity. Several problems may arise because of this. The learner may be "forced" to arbitrarily reduce the number of items by dropping some of the items. Or, recency and primacy effects may come into play. That is, the dialogue may be treated as a "list". Experiments show that when lists are learned, the first items (primacy effect) and the last items (recency effect) are remembered best while items in the middle of the list are forgotten. Just exactly this, in fact, often happens when F-L students are learning new structures. They produce the "beginning" of a new structure, muddle the middle, and produce the "end" correctly.

In spite of the fact that ALM is based on an associationism Skinnerian view of learning as habit formation (Diller, 1971), IPM seems to predict reasonably well some of the problems associated with the ALM method.

Philip Smith's suggested generative grammar lesson for beginning students in Portuguese is similar to, but much longer than, the ALM lesson. It is:

" Este é João
 Bom dia, João.
 Bom dia.
 Você é João
 Sou sim.
 Esta é Rita.
 Rita, você conhece João.
 Não conheço não.
 João, apresento Rita.
 Muito prazer, Rita.
 Muito prazer, João.
 João é brasileiro.
 Ele é estudante.
 Rita é brasileira.
 Ela é professora. "

(1971, p. 73)

No native language translation of the above is recommended, but, a set of visuals which are intended to illustrate the meaning of the conversation are supplied.

The author suggests a "quick one-time through overview" in which visual images appear before the verbal material, after which, four line segments are taught by repetition of each line [which is] forced by teacher questioning [e.g.:]

"T. Este e Joao. Quem e?

S. Joao e Joao

T. Quem e este?

S. Este e Joao."

(1971, p. 74)

The IPM model would predict difficulties with this method similar to those encountered in the ALM method. But, the problems with GG approach might be compounded by the two separate stimulus, i.e. visuals (cartoon representations of people pointing to each other superimposed on a map of Brazil) and the oral presentation of the fifteen line conversation between three persons being alternately presented to students.

IPM postulates a separate sensory register for each sense, and assumes that stimuli presentation in the visual-iconic register follow a similar system for reaching LTM as do auditory-echoic register stimuli. Thus the learner in a "quick run-through" is attempting to process a great deal of information in two registers almost simultaneously. The visual-iconic stimulus is expected to provide the meaningful concept whereby the oral stimulus can be recognized. However, since the iconic stimulus must also be recognized for meaningfulness, there is no assurance that the learner will decipher the stimulus correctly, or even have the time to send the information

to LTM before the new echoic stimulus presentation causes decay (forgetting) through interference.

Smith does not expect students to process fifteen lines of conversation in one run-through. He suggests forcing repetition, line by line, through questioning in Portuguese. The learner is expected to respond to a statement and a question such as "Este e Joao. Quem e?" with the answer "Joao e Joao." (p. 74) But, since "Quem e?" is actually a different unprocessed stimulus, it would seem that rather than a process of strengthening the trace of stored information in LTM, a new cycle of pattern recognition is begun.

It should be noted that this Generative-Grammar approach is based on the belief that students will be led to discover the deep structures of the new language via the method; that "The person who really knows a language . . . can analyze utterances at the 'Deep Structure' level . . . [that] the language learner should be consciously involved in the learning quest . . . [and that] finally the only proper response to a unit of language, even if it is incomprehensible, is a purposeful reply" (Smith, 1971, p. 102). In spite of different theoretical orientations, both the audio-lingual and the generative grammar methods use similar materials and IPM predicts similar problems in F-L remembering.

For the introductory lesson in the "Silent Way",
Caleb Gattegno suggests the following:

The teacher . . . draws out one rod and shows it to the class while saying in the foreign language the word for rod with the indefinite article, if it exists in the language. He puts it down in silence and picks up another rod of a different color and says the same (one or two) words again and so on, going through seven or eight rods and never asking for anything The teacher lifts a rod and asks in mime for the sounds he uttered. At the next trial . . . the whole class repeats the sound for a rod [very approximately in most cases]. The teacher doesn't inquire whether some students are thinking of a piece of wood, others of lifting something, or something different, contact has been made without the use of venacular and that is all that is wanted. (1972, p. 35)

In the next part of the lesson colored rods are shown and identified, e.g. "an orange rod, a blue rod," etc. After students are able to verbally identify the rods, the teacher says "Give me a blue rod," and mimes for the student to hand him one. The student need only carry out the instruction. He is not required to say anything. Once this new auditory stimulus is established, the student will be asked to give similar directions to other students to carry out. Each part of the lesson is designed to integrate meaning and phonemic code within the student's mind.

IPM would predict that this method should be quite successful. The learner is provided with a meaningful concept, the rod, and an auditory stimulus

limited enough to be processed in both the sensory register stage and the STM stage. No activity on the student's part is called for until seven or eight oral and visual presentations are made. Thus a certain portion of a new phonemic code along with meaningful concepts should be stored in LTM prior to any active response by the students. The method provides time for students to rehearse the stimulus, since teachers are strictly required to maintain silence between presentations. No distractions, such as teacher comments on the correctness of student response or discussion of grammar, are permitted during the learning period.

Gattegno bases his approach on the belief that students must develop an "inner criteria", a core of knowledge into which new language can be integrated. This inner criteria concept seems to be close in meaning to the knowledge store in LTM which IPM postulates is necessary for pattern recognition, in the sensory register stage and mediation, in the STM stage. Although Gattegno says the "Silent Way" will "provide an integrative schemata that will hold sounds together as they are met, and will not require the effort of association which usually accompanies memory," (1972, p. 28) his method fits well into an IPM view of learning.

The last method to be described, the Community Language-Learning approach is reflective of the counseling learning movement of which it is an outgrowth. Students are referred to as clients and the teacher who must be bilingual is called a counselor. Lessons as outlined in the three previous methods do not exist. In CL-L, students seated in a closed circle, tape record a conversation which they initiate. The topic of the conversation is of the students' own choosing. Begin in "Evaluative and Emotional Factors in Learning a Foreign Language" describes a first stage lesson in this way.

First he [the client-student] expresses only to the counselor and in English, what he wishes to say to the group. Each group member overhears this English exchange, but is not involved in it. The counselor then reflects these ideas back to the client in the foreign language in a warm and accepting tone, in simple language using cognates preferably, in phrases of five or six words. The client turns to the group and presents his ideas in the foreign language. He has the counselor's aid if he mispronounces or hesitates on a word or phrase. (1971, pp. 26-27)

After a conversation of some ten minutes, the tape recorded foreign language portion of the conversation is played back. The clients and counselor then analyze the components of the conversation and transcribe the oral language into writing.

That there may be difficulties with the methods vis-a-vis the IPM model is apparent. Firstly, the phonemic code never passes beyond the STM stage because the

individual student with prompting from the teacher repeats what he has heard immediately. The stimulus is processed through the sensory register (probably imperfectly) attached to a meaningful concept, but the repetition of F-L structures only requires brief storage in STM. Later during the tape recorded play back period, students analyze the F-L utterances they have made. However, they are then working with student approximations of the F-L code, since the teacher translation during the previous conversation is not recorded. Since no provision is overtly made for rehearsal or mediation, how do students learn via CL-L? Stevick commenting on CL-L says the following: "CL-L seems to be particularly effective with students who have studied the language in a traditional course for a year or more but who cannot make active use of it." (1976, p. 132) It is possible to assume that a store of knowledge, the phonemic code and syntactical rules, is already available in LTM and that pattern recognition, mediation and chunking are operating. And further that the method removes the emotional barriers to F-L learning, allowing the student to use his LTM knowledge.

CONCLUSION

The comparison of the four methods with an information processing model of memory leads to the following conclusions:

1. At least for foreign language instruction IPM is a reasonable model of the learning process, since it predicts and provides an explanation for some of the more common errors made in F-L classes.

2. Neither the audio-lingual nor the generative-grammar approach are compatible with an IPM view of language instruction. Support for the second conclusion can be found in the fact that studies to determine the superiority of an ALM over a GG approach have indicated no significant differences between methods. Perhaps the lack of significant differences is due to insufficient attention to the process of establishing LTM stored F-L knowledge.

3. Since the Silent Way does fit the IPM model, and ALM and GG do not, perhaps additional comparative studies between the methods would have value.

Conclusions relative to Community Language

Learning are not included here because the method is designed to deal with affective factors in the language class. And memory experiments indicate that affective factors are most prominent in the LTM stage, which was not covered in this paper.

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